United States Department of the Interior
NATIONAL PARK SERVICE
INTERMOUNTAIN FIELD AREA
Southwest System Support Office
P. O. Box 728
Santa Fe, New Mexico 87504-0728

In reply refer to:

L7619(SWSO-PGS)

AUG 2 6 1996

Mr. Rob R. Reid
Project Manager/Vice President
Espey, Huston & Associate, Inc.
P.O. Box 519
Austin, Texas 78767-0519

Dear Mr. Reid:

This responds to your request for our review of the environmental assessment/project information for the Fisher County, Texas that is proposing to construct new electric transmission facilities. On a technical assistance basis, we find that there are no apparent effects on National Park Service management areas or program responsibilities.

We appreciate the opportunity to review this proposal.

Sincerely,

for Program Leader
Stewardship & Partnership

TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744 • 512-389-4800

ANDREW SANSOM
Executive Director

September 19, 1996

Mr. Rob Reid
Espey, Huston & Associates, Inc.
206 Wild Basin Road, Suite 300
Austin, TX 78746-3343

Re: New Transmission Facilities, West Texas Utilities, Fisher County

Dear Mr. Reid:

Thank you for coordinating with this agency in your planning activities regarding the proposed transmission line. Department staff have reviewed the project. Comments in this letter are intended to assist your planning efforts and are provided to minimize effects of this project upon fish, wildlife, and plant resources.

This project involves construction of a new 69 kV transmission line between an existing West Texas Utilities line northwest of Longworth and a substation proposed on State Highway 70. The information provided for review was fairly limited. However, the map attached to your letter shows the existing transmission line crossing a county road that connects with S.H. 70 at the proposed substation. Therefore the Department recommends constructing the transmission line along the existing rights-of-way to minimize impacts to fish and wildlife resources.

A search of the Texas Biological and Conservation Data System (BCD) revealed no presently known occurrences of special species or natural communities in the general vicinity of the proposed project. This information is based on the best data currently available to the state regarding threatened, endangered, or otherwise sensitive species. These data do not provide a definite statement as to the presence or absence of special species or natural communities within your project area, nor can these data substitute for an evaluation by qualified biologists. This information is intended to assist you in avoiding harm to species that occur on your site. Please contact the Texas Parks and Wildlife Department's BCD Information Managers before publishing or otherwise disseminating any specific locality information.

I appreciate the opportunity to review and comment on your letter.

Sincerely,

Kathy Boydston

Kathy Boydston
Wildlife Habitat Assessment Program
Wildlife Division

KKB:dab

APPENDIX B
PUBLIC OPEN HOUSE INFORMATION

PUBLIC INVOLVEMENT
OPEN HOUSE

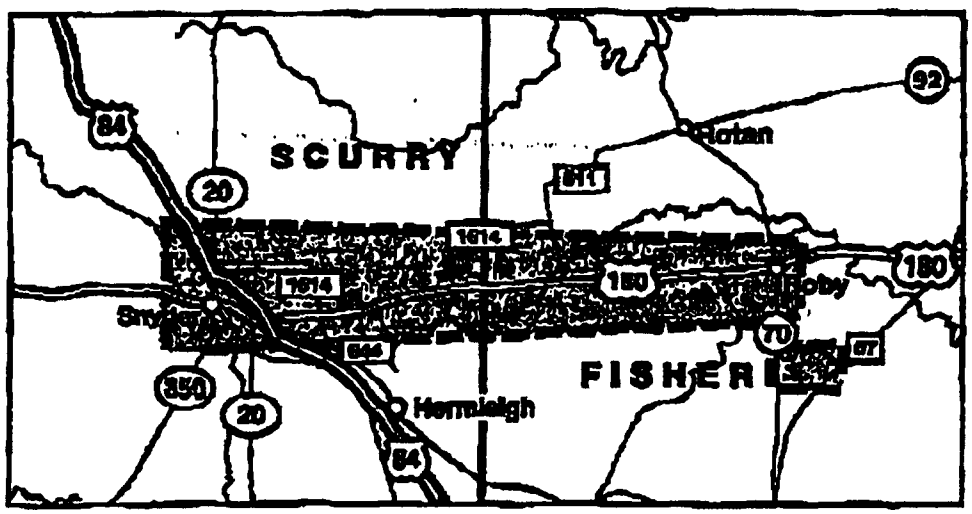
Presented by
West Texas Utilities Company
Midwest Electric Cooperative, Inc.

Fisher and Scurry Counties
69KV Electric Transmission Line and Substation Project

Monday, October 14, 1996
5 P.M. until 8 P.M.
Roby Community Center
105 S. Concho Street
Roby, Texas

And

Tuesday, October 15, 1996
5 P.M. to 8 P.M.
Northeast Scurry County
Community Center
7 Miles East of Snyder on
Camp Spring Road 134



Proposed Project Area ———

West Texas Utilities Company (WTU), in cooperation with Midwest Electric Cooperative, Inc. (MWEC), is seeking input from the public on the planned construction of a 69,000-volt (69KV) electric transmission line and substations from Texas Utilities Electric Company's 37th Street Substation in Snyder, Texas, to the SN 1X Industrial Park, to MVEC's existing 69KV line, to its Plainview substation, to a new substation south of Hobbs, to Roby, Texas, and a 69KV transmission line to a new substation to be located north of Longworth, Texas.

WTU and MWEC representatives will be available at the open house to discuss type of structures planned, construction methods, and right-of-way requirements. Visitors will be given the opportunity to ask questions about the project, express concerns, and make suggestions about the routing of the lines and siting of the substations within the proposed project area.

For more information about the Open House:
Contact Mr. Rick Miller at WTU's Roby office (915-776-2421), Mr. Jimmy Kiker at MWEC's Roby office (915-776-2244), or Mr. Jerry Schriver at MWEC's Snyder office (915-573-3161).

WEST TEXAS UTILITIES COMPANY
IN COOPERATION WITH
MIDWEST ELECTRIC COOPERATIVE
ROBY TO SNYDER 69 KV
TRANSMISSION and SUBSTATION PROJECT

OPEN HOUSE

MONDAY, OCTOBER 14, 1996
TUESDAY, OCTOBER 15, 1996
5:00 - 8:00 P.M.

Thank you for taking time to become involved in the transmission line routing and substation siting process for West Texas Utilities Company (WTU) and Midwest Electric Cooperatives (MWEC) 69 kV Transmission Project between Roby and Snyder and a short tap north of Longworth.

This project is intended to improve the reliability of power available to MWEC in the Snyder/Roby/Sweetwater area, as well as providing a lower cost of power. This project will provide the necessary electric supply capacity to efficiently and reliably serve existing customers as well as future growth in this area.

This project involves the construction of three new substations (Hobbs, Longworth and Sn Tx) and the transmission lines between the existing substations at Roby, Snyder and Plainview. The transmission line sections that will be constructed are as follows:

- A new 69 kV transmission line will be constructed by WTU from TUEC's 37th Street Substation in Snyder to MWEC's new Sn Tx Substation that will be constructed in the Sn Tx Industrial Park east of Snyder.
- MWEC will construct a 69 kV transmission line from this substation to its existing 69 kV transmission line to its Plainview Substation which is located just north of the Price Daniel Prison.
- WTU will then construct a 69 kV transmission line from MWEC's Plainview substation to WTU's new Hobbs Substation that will be constructed south of the Hobbs Community and the 69 kV will continue east to Roby.
- WTU will also construct a transmission line from its existing Roby to Eskota 69 kV transmission line to the new Longworth Substation that will be located north of the community of Longworth.

New transmission line rights-of-way and substation sites will be acquired from landowners by WTU for this project.

The purpose of this meeting is to let you know some background information about the project and to provide you with an opportunity to make suggestions, let us know your concerns and ask questions.

Before leaving, we would greatly appreciate your completing the attached questionnaire. Your response will assist us in understanding the concerns of the community and allow us to consider these concerns during our site and route selection process.

Again, thank you for your time and concern.

ROBY-SNYDER 69 KV PROJECT

In an effort to better evaluate public concerns, we would appreciate it if you would take a moment and answer the following questions. Please use the back of these pages if you need additional space for your questions or comments.

1. Do you understand the need for this transmission line? ___ Yes ___ No.

2. What areas do you believe should be considered of greatest concern when WTU and WMEC look for an area for a transmission line or a substation site? If you have more than one concern, please rank them 1, 2, 3, etc.

   _____ Cultivated land

   _____ Pasture land

   _____ Waterways

   _____ Recreational or park areas

   _____ Residential areas or residences

   _____ Existing right-of-ways

   _____ Historic sites

   _____ Wildlife

   _____ Others (please specify) _____

   _____

3. Which of the proposed alternative routes looks best to you? Why?

4. Do you have any suggestions for improving any of the proposed alternative routes? If so, what are your reasons for these suggestions?

5. How did you learn about the open house?

_____ Newspaper

_____ Letter to Landowner

_____ Other

6. Which of the following applies to you? (You may check more than one item.)

_____ my residence is near one of the alternative routes.

_____ my property is crossed by one of the alternative routes.

_____ I work near one of the alternative routes.

_____ I travel frequently near one of the alternative routes.

_____ I visit public places near one of the alternative routes.

_____ other (please specify) _____

7. Do you have any general remarks or questions?

WTU and MWEC would like to thank you for your time and comments that you have made for this open house. Please turn in your completed questionnaire at this meeting or mail within 10 days to:

Mr. Larry Roberson
Central and South West Services, Inc.
P.O. Box 21928
Tulsa, Oklahoma 74141-1928
918-594-4131

Optional: Name _____

Address _____

_____

Phone Number (home) _____

(office) _____

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants

Document No. 960748
EH&A Job No. 17653

ENVIRONMENTAL ASSESSMENT AND ALTERNATIVE ROUTE ANALYSIS FOR THE PROPOSED SNYDER TO ROBY 69-KV TRANSMISSION LINE PROJECT SCURRY AND FISHER COUNTIES, TEXAS

Prepared for:

West Texas Utilities Company
P.O. Box 841
Abilene, Texas 79604

and

Midwest Electric Cooperative, Inc.
P.O. Box 518
Roby, Texas 79543

Prepared by:

Espey, Huston & Associates, Inc.
P.O. Box 519
Austin, Texas 78767

November 1996

Printed on Recycled Paper

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1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 SCOPE OF PROJECT

West Texas Utilities Company (WTU) and Midwest Electric Cooperative, Inc. (MWEC) have entered into an agreement for electrical power service at four new points of delivery from WTU at the existing Plainview Substation and the proposed Hobbs, SN TX, and Longworth substations. WTU, in cooperation with MWEC, is proposing to construct new electric transmission and substation facilities in Fisher and Scurry counties to accomplish this agreement. These proposed facilities include:

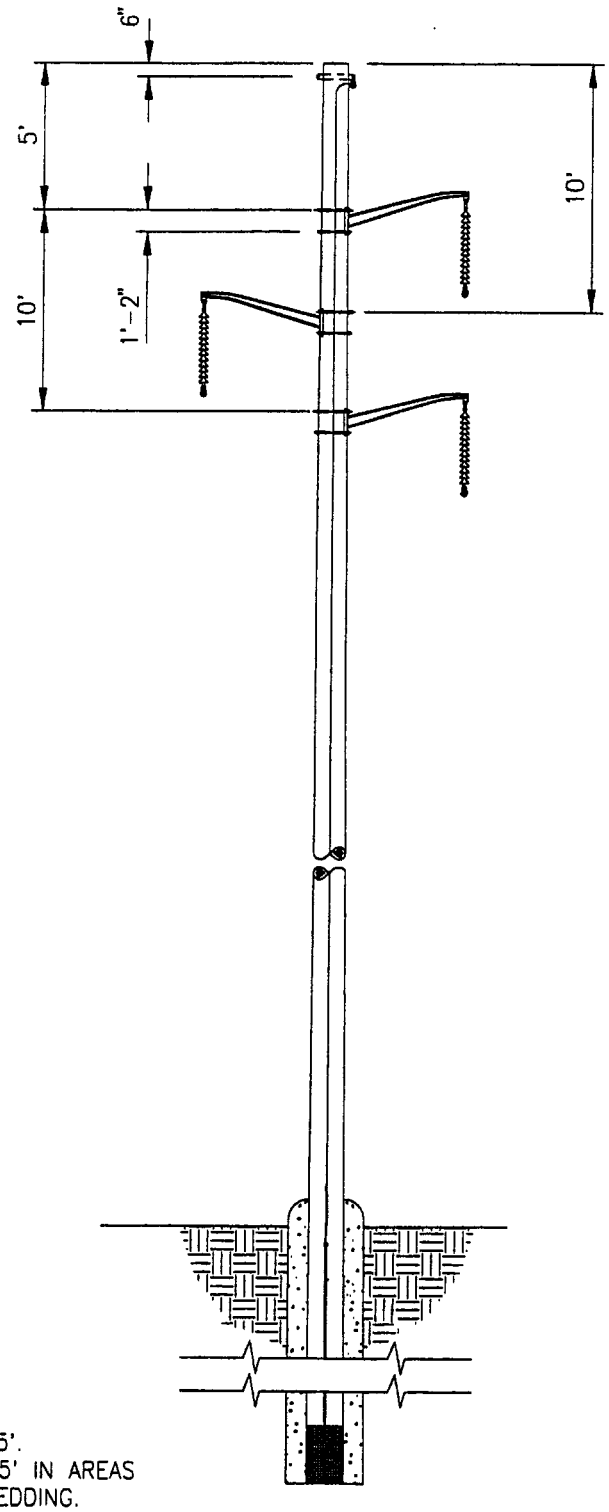
1. A 69-kilovolt (kV) transmission line between WTU's Roby Substation (located at the corner of North 3rd and Angelo streets in Roby and MWEC's Plainview Substation (located at the intersection of Farm-to-Market Road (FM) 1673 and Camp Springs Road, east of Snyder), via the proposed Hobbs Substation (located near the intersection of U.S. Highway (U.S.) 180 and FM 611 in Fisher County).

2. A 69-kV transmission line between the Plainview Substation and MWEC's new SN TX Substation (located on U.S. 84, east of Snyder). This line will consist of a segment of existing MWEC 69-kV circuit west out of the Plainview Substation and a new segment of 69-kV line between the existing line and the SN TX Substation. This segment is addressed in a separate Borrower's Environmental Report (BER) which will be submitted to the federal Rural Utilities Service and the Public Utility Commission of Texas (PUC) by MWEC.

3. A 69-kV transmission line between the new SN TX Substation and Texas Utilities Electric Company's (TU Electric's) 37th Street Substation (located in Snyder).

4. A 69-kV tap line between WTU's existing Roby to Eskota 69-kV line and the new Longworth Substation (located northwest of Longworth on State Highway (SH) 70). This segment is addressed in a separate Environmental Assessment (EA) which will be submitted to the PUC.

WTU will construct all of the above facilities with the exception of proposed facility No. 2 (69-kV line between the Plainview Substation and the new SN TX Substation), which will be constructed by MWEC. All the projects will be constructed on single poles (wood, steel, or concrete) with davit arms (Figure 1-1)



NOTE:

1. DAVIT ARM LENGTH IS 4.5'. BOTTOM DAVIT ARM IS 5.5' IN AREAS WHERE THERE IS ICE SHEDDING.
2. FOUNDATION DEPTH AND DIAMETER DETERMINED FROM GEOTECHNICAL AND LOADING DATA.

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants

Figure 1-1

TYPICAL WTU SINGLE POLE STRUCTURE

SNYDER-ROBY PROJECT
WTU/MWEC

within a 35- to 60-foot (ft) wide right-of-way (ROW), depending on location. Structure heights will typically vary between 70 and 90 ft depending upon terrain, structure location, and span length.

1.2 PURPOSE AND NEED FOR PROJECT

MWEC has contracted with WTU to provide wholesale power to MWEC at four new delivery points (Hobbs, Longworth, Plainview, and SN TX). MWEC's existing meter points with TU Electric at Hermleigh, Plainview, West Sweetwater, and Sweetwater-Roby Highway will be abandoned. MWEC's delivery points at Roby, Hermleigh, West Sweetwater and Sweetwater-Roby Highway are served from either TU Electric's or WTU's distribution lines. The conversion from distribution delivery points to 69-kV transmission delivery points will improve reliability to MWEC's customers by reducing distribution exposure and providing bi-directional feed to MWEC's existing Plainview Substation and the new SN TX and Hobbs substations.

To accomplish this, WTU will establish a new interconnect with TU Electric at their 37th Street Substation on the south side of Snyder and then construct a 69-kV single-pole transmission line from the 37th Street Substation to MWEC's SN TX Substation. MWEC will be constructing the SN TX Substation and a 69-kV single-pole line north from this station to its existing 69-kV transmission line serving the existing Plainview Substation. The SN TX delivery point will serve a new cotton textile mill at the SN TX I Industrial Park. This part of the project is to be in service by September 1, 1997.

WTU will also construct a 69-kV single pole transmission line from MWEC's Plainview Substation to WTU's new Hobbs Substation that will be constructed near the intersection of U.S. 180 and FM 611. The new Hobbs delivery point will serve the load from WTU's Rotan delivery point and from TU Electric's Hermleigh and West Sweetwater meter points. WTU will also construct a 69-kV single pole transmission line from the Hobbs Substation to WTU's existing Roby Substation.

1.3 DESCRIPTION OF PROPOSED CONSTRUCTION

1.3.1 Land Requirements

The easement width for the proposed 69-kV transmission line will vary from 35 to 60 ft. Where the proposed line will parallel existing roads, ROW width will be 35 ft with the poles approximately 5 ft inside the ROW. For segments of the line not located near roads, the ROW will be 60 ft in width. WTU includes a provision in its easements that the building of permanent structures

within the ROW will not be permitted. Other than this restriction, landowners will retain the right to raise crops and pasture livestock within the ROW.

1.3.2 Right-of-Way Clearing

Although the majority of native vegetation within the study area has been cleared for agricultural purposes, some clearing of the ROW may be necessary to assure clearance for the overhead conductors and to facilitate maintenance. In these areas, a width of no more than 60 ft will be mechanically cleared prior to construction. The impact to pasture will be minimized by routing the proposed line approximately parallel to existing fences when possible and minimizing scarification of the ROW necessary to allow for construction of the line. A U.S. Environmental Protection Agency (EPA) approved herbicide will be applied in accordance with state and federal guidelines in certain areas to tree stumps and other selected vegetation to limit regrowth in the ROW.

1.3.3 Right-of-Way Cleanup

After construction all debris will be removed from the site. The ROW will be smoothed and graded to the approximate original contour. Cleared areas will be allowed to seed naturally to reduce erosion and restore a natural aesthetic appearance.

1.3.4 Maintenance

Maintenance of the facilities will include periodic inspection of the line, repair of damaged structures due to equipment failures, accidents, or natural phenomena such as wind damage. While maintenance patrols will vary, aerial patrols and foot patrols will be performed periodically. In cropland areas and properly managed grazing lands, little or no vegetation control will be required, due to existing land use practices. The major maintenance item will be the trimming of danger trees (trees that pose a potential danger to the conductors or structure) in order to provide a safe and reliable power line. Where needed, EPA-approved herbicides will be applied to limit regrowth and ensure that proper clearances are maintained.

1.3.5 Health and Safety Hazards

All work will be performed in accordance with all applicable laws, rules, regulations, orders, standards, codes, and ordinances of all federal, state, and local governmental bodies. Such laws,

rules, regulations, orders, standards, codes, and ordinances include, but are not limited to: the National Electric Safety Code (NESC); the American Society of Mechanical Engineers (ASME) code: the American National Standards Institute (ANSI) Standards; the American Society for Testing and Materials (ASTM); the National Electric Code (NEC); the National Fire Protection Association Standard; and the National Association of Corrosion Engineers (NACE) Standards. All such applicable laws, rules, regulations, orders, standards, codes, and ordinances will be incorporated in and made applicable to all contracts associated with the work performed.

1.3.6 Design Parameters

The nominal operating voltage of the new transmission line from WTU's Roby Substation to TU Electric's 37th Street Substation will be 69-kV from phase to phase. The conductor for each of the three electrical phases will be single T-2 Penguin aluminum conductor, steel reinforced (ACSR). T-2 Penquin ACSR is two 4/0 AWG 6/1 ACSR conductors wrapped together. Each 4/0 conductor will have six strands of aluminum and one strand of steel. A single 3/8-inch extra high strength steel cable will be installed at the top of the structure to shield the line from lightning.

The single pole tangent structures will be either wood, steel, or concrete and will be supported by a concrete foundation that will vary in size and depth depending on soil conditions that will be determined from geotechnical engineering studies.

All clearances and other safety factors will meet or exceed those required by the NESC. The conductor sag in the span between the structures will vary depending on electrical load and weather conditions. At 212 degrees Fahrenheit, minimum design ground clearance will be 25 ft.

The average span distance between structures will be approximately 600 ft, resulting in placement of approximately 9 structures per mile. However, the actual span length at any point along the line will depend on local terrain, land use, and clearance requirements.

1.4 AGENCY ACTIONS

This Environmental Assessment (EA) and Alternative Route Analysis report was prepared by Espey, Huston & Associates, Inc. (EH&A) to support WTU in their application for a Certificate of Convenience and Necessity (CCN) from the PUC. This document is intended to address environmental criteria contained in Section 2.255.(c) of the Public Utility Regulatory Act of 1995, as well as answer relevant questions in the PUC's CCN application. The EA may also be used in support of any other federal, state, or local permitting requirements, if necessary.

2.0 SELECTION/EVALUATION OF ALTERNATIVES

2.0 SELECTION AND EVALUATION OF ALTERNATIVE TRANSMISSION LINE ROUTES

The objective of this study was to select and assess environmentally sound and acceptable alternative routes for WTU's Snyder to Roby Project that were also feasible from economic and engineering standpoints, and ultimately to select a preferred route. EH&A made its recommendation of a preferred route based only upon environmental considerations; WTU took into consideration cost and engineering factors in their evaluation and selection of a preferred route. The proposed lines will range from approximately 26 to 28 miles in length for Segment A, to 3.2 to 3.5 miles in length for Segment B, depending on the alternative routes selected.

The delineation of alternative routes was performed by WTU, with assistance from EH&A, as discussed below. WTU initially evaluated numerous preliminary alternative transmission line routes for the project. The following sections provide a description of the methodology used in the route selection and evaluation process, which followed similar procedures typically used by EH&A to evaluate alternative transmission line routes. The methodology consisted of data collection, constraints mapping, alternative route delineation and evaluation, and preferred route selection.

2.1 DATA COLLECTION

Data used in the delineation and evaluation of alternative routes were drawn from a variety of sources, including published literature (documents, maps, aerial photography, etc.), contacts with local, state and federal agencies, and input from the open house meetings. Recent aerial photography (black and white), various scale U.S. Geological Survey (USGS) topographic maps, Texas Department of Transportation (TxDOT) county highway maps, National Wetlands Inventory (NWI) maps, and ground reconnaissance surveys were used throughout the selection and evaluation of alternative routes. Ground reconnaissance of the study area by EH&A staff in August, September, and October, 1996 was utilized for refinement and evaluation of the alternative routes.

2.2 ALTERNATIVE ROUTE SELECTION AND EVALUATION

2.2.1 No Action Alternative

Under the No Action Alternative, WTU/MWEC would not construct or operate the proposed 69-kV transmission line and substations. Benefits to MWEC, in the form of increased service reliability, lower-cost electrical power, and providing sufficient electrical capacity for both existing customers and future growth, would not be realized. Any potential impacts related to the project, short-term or long-term, would not occur.

2.2.2 Alternatives to the Project

Renewables

Solar and wind generation were considered for the proposed project need but both were rejected because neither is capable of furnishing the necessary firm source of supply for the MWEC load at affordable costs. Solar, thermal, and photovoltaic energy conversion methods are not yet cost competitive for this type of load requirement as compared to the cost of the proposed transmission line. A more detailed discussion of these items follows.

Photovoltaics

MWEC has a requirement for 24 hours per day operation. For the use of photovoltaics, provisions would have to be made to provide power at night and at other times of reduced sunlight. If one assumes that 8 hours of sunlight is available per day, then battery capacity would have to be installed to provide service during the other 16 hours in the day to allow 24 hour per day operation. This option was rejected because it is not capable of furnishing the necessary firm source of supply for MWEC at affordable costs.

Wind Turbines

As with photovoltaics, enough wind turbine capacity would have to be installed to allow for service during low wind conditions. Since specific wind information is not available for the study area, WTU assumed that average wind speeds would provide 25% of the rated output of the wind turbines. This is a very conservative approach because there will likely be times when there is no wind

and as a result, no output. This option was also rejected because it is not capable of furnishing the necessary firm source of supply for MWEC at affordable costs.

2.2.3 Study Area Delineation

The first step in the selection of alternative routes was to establish a study area within which the alternative routes for each segment would be located. The boundaries of the study area encompass both termination points for the project (the cities of Snyder and Roby) and include an area large enough to assess potential impacts as well as to allow for numerous possible alternative routes. As shown on Figure 2-1, the roughly rectangular-shaped study area is approximately 7 x 32 miles and encompasses approximately 145,000 acres (ac).

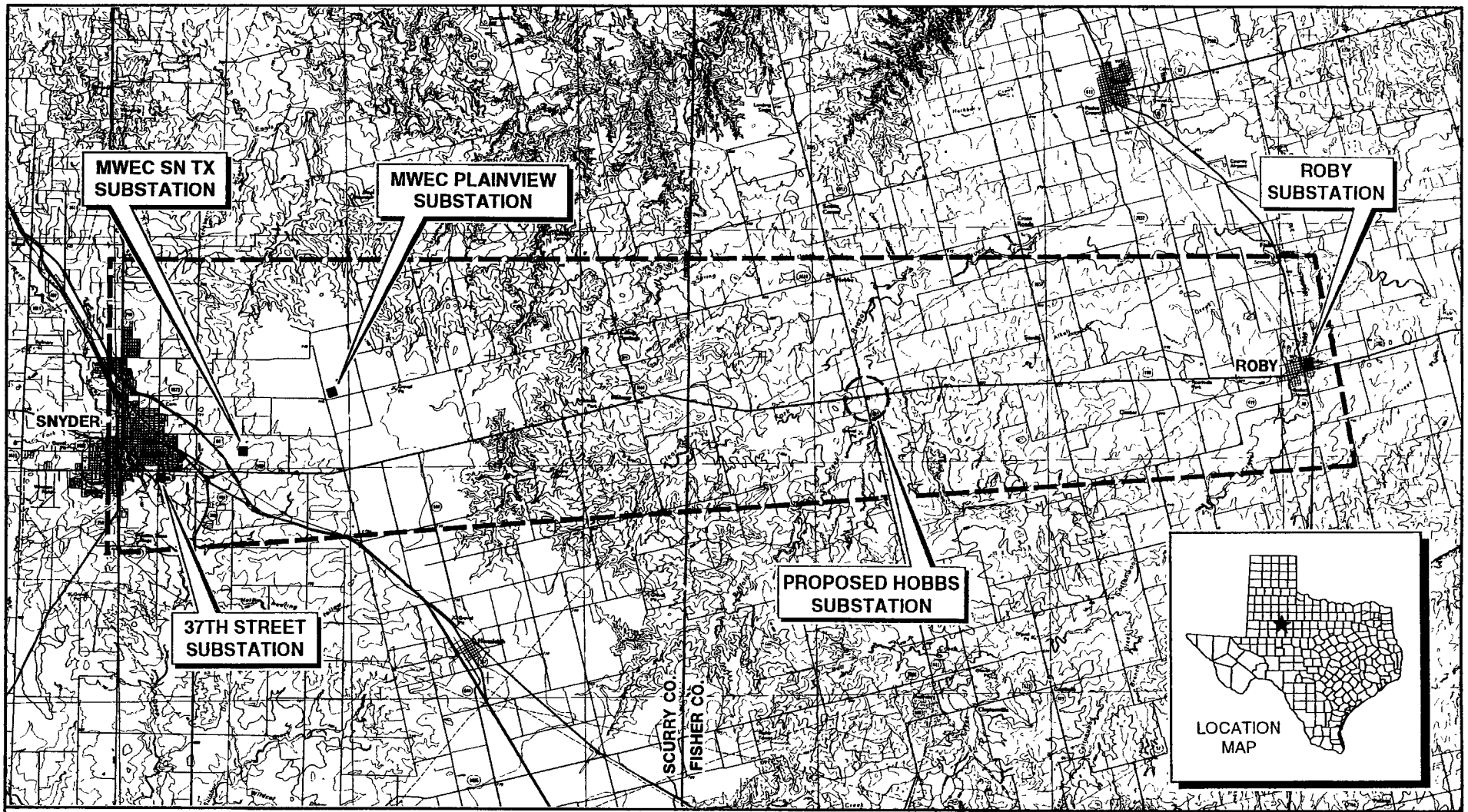
2.2.4 Constraints Mapping

Following the delineation of study area boundaries, EH&A performed an environmental constraints mapping analysis. Through a review of published literature, topographic maps, aerial photographs, site visits, and some agency contacts, features or areas that could present some degree of constraint in locating the proposed facilities within the study area were identified. These constraints included potentially sensitive land uses (communities, residential areas, floodplains, parks, circle-pivot irrigation systems, etc.), recorded cultural resources sites, and ecologically sensitive areas. These maps (figures 2-2a and 2-2b, map pocket) were used as a guide in delineating preliminary alternative routes.

2.2.5 Preliminary Alternatives

Factors considered during the selection of preliminary alternative routes for the proposed transmission lines included the following:

- utilizing existing transmission line ROW, if feasible
- paralleling existing ROW (transmission line, pipeline, roads, highways, etc.)
- paralleling existing property lines and/or fencelines
- minimizing potential impacts to communities, rural residential subdivisions, or other development
- minimizing proximity to individual residences and businesses
- minimizing potential impacts to cultivated cropland and above-ground irrigation systems
- overall length



Base Map: USGS 1:100,000 Quadrangle; Snyder, Texas

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants

Figure 2-1

STUDY AREA
SNYDER – ROBY 69-KV PROJECT

WTU/MWEC

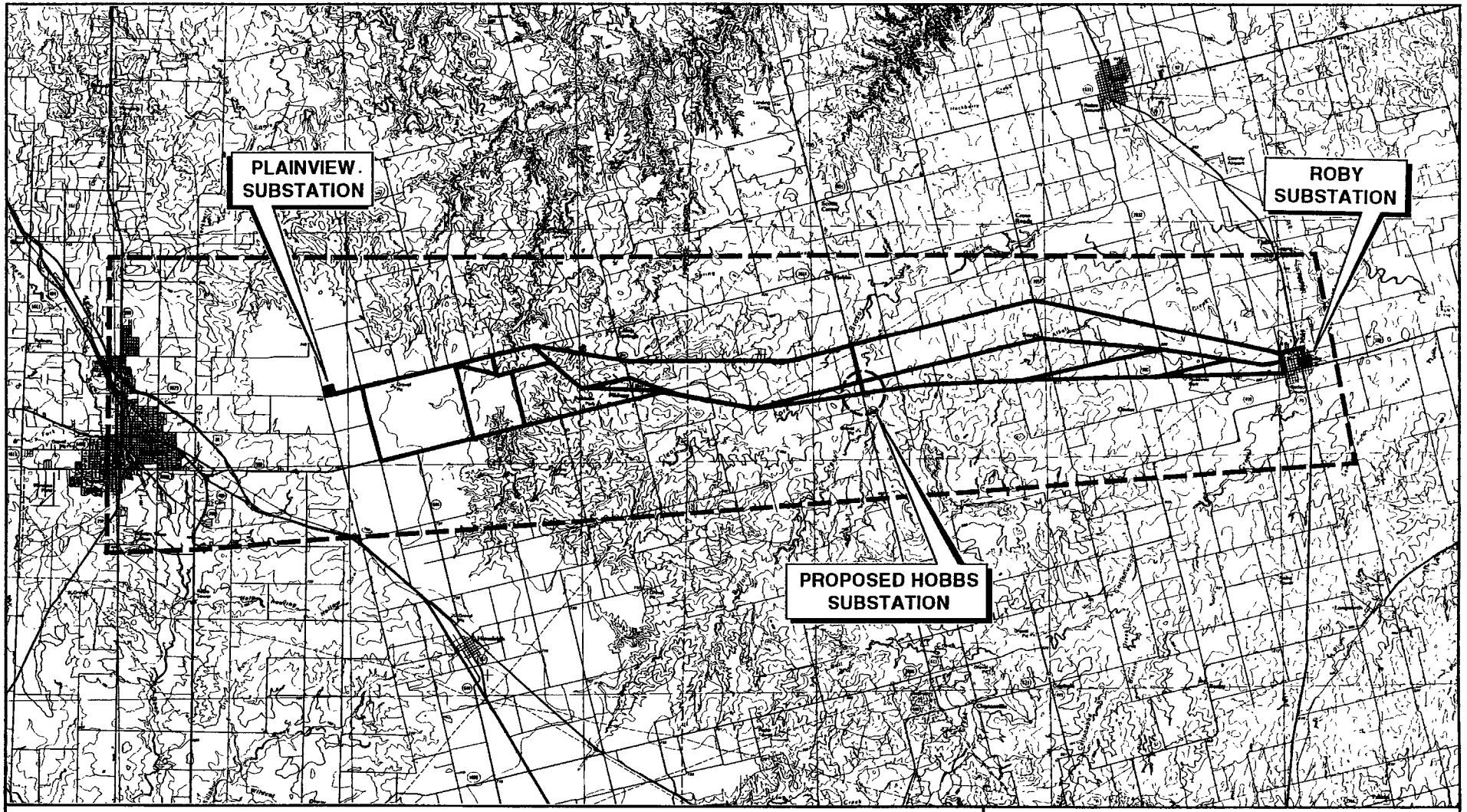
Since a virtually unlimited number of potential routes exist between the proposed end-points, WTU used the constraints map to eliminate environmentally sensitive areas and other potentially affected land uses from further consideration as transmission line locations, wherever possible. The overall impact of the alternative routes evaluated later in this document has been greatly reduced by avoiding, to the greatest extent possible, these identified constraints. Figure 2-3 illustrates the location of the preliminary alternative routes developed by WTU for Segment A. These routes consist of a network of individual links that combine to form numerous alternative routes. Since Segment B was a much shorter project, there were fewer possible alternative routes. WTU looked at several potential alignments and ultimately delineated three alternative routes for analysis. Following the delineation of preliminary routes, EH&A and WTU subjected these alternatives to further evaluation with the aim of reducing the number of routes to a smaller number of primary alternatives. Adjustments were made in the location and alignment of several individual links to further reduce potential environmental impacts, and some links or segments were added, or dropped entirely.

2.2.6 Public Open House Meetings

WTU and MWEC held two public open-house meetings in the study area on October 14 and 15, 1996. These meetings were intended to solicit comments from citizens, landowners and public officials concerning the proposed project. Specifically, these meetings had the following objectives:

- Promote a better understanding of the proposed project including the purpose, need, and potential benefits and impacts
- Inform and educate the public with regard to WTU's routing procedure, schedule, and decision process
- Ensure that the decision-making process accurately identifies and considers the values and concerns of the public and community leaders.

Public involvement contributed both to the evaluation of issues and concerns by WTU/MWEC and EH&A, and to the selection of a preferred route for the project. The first meeting (October 14) was held at the Roby Community Center and the second (October 15) at the Northeast Scurry County Community Center, located at the intersection of Camp Springs Road and CR 1105, east of Snyder. Both locations are inside the study area boundary. WTU/MWEC sent written notice of the meetings to all potentially-



north

1 0 1 2 3 4 5 miles

Study Area Boundary

Preliminary Alternative Route

Base Map: USGS 1:100,000 Quadrangle; Snyder, Texas

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants

Figure 2-3

PRELIMINARY
ALTERNATIVE ROUTES

WTU-SNYDER TO ROBY PROJECT

affected landowners along the alternative routes and to local public officials. In addition, advertisements were run in local newspapers (the Rotan Advance-Star Record and the Snyder Daily News) announcing the location, time, and purpose of the meetings. Copies of these letters and the advertisement are included in Appendix B.

At the meeting, rather than a formal presentation in a speaker-to-audience format, WTU, MWEC, and EH&A staff utilized space in the community centers by setting up several information stations. Each station was devoted to a particular aspect of the routing study and was manned by WTU, MWEC, and/or EH&A staff. Each station had maps, illustrations, photographs and text explaining each particular topic. Interested citizens and property owners were encouraged to visit each station in order, so that the entire process could be explained in the general sequence of project development. The information station format is advantageous because it allows attendees to process information in a more relaxed manner and also allows them to focus on their particular area of interest and ask specific questions. More importantly, the one-to-one discussions with WTU/MWEC/EH&A staff encourage more interaction from those citizens who might be hesitant to participate in a speaker-audience format.

WTU/MWEC staff at the first station signed visitors in and handed out a project summary sheet and questionnaire. The questionnaire solicited comments on citizen concerns as well as an evaluation of the information presented at the open house. Copies of the questionnaire and handout can be found in Appendix B.

Twelve people attended the first open house at the Roby Community Center on October 14. Of the attendees who filled out the questionnaire (five) there was a strong preference on Segment A for routes using Link E (which parallels U.S. 180). Other links on this segment receiving positive comments were B, F, and K. The only links receiving negative comments were I and J, which run north of U.S. 180 either cross-country or parallel to local and county roads. No direct comments were made regarding Segment B. When asked what areas should be considered of greatest concern during the routing process, the highest ranking was given to residential areas/residences, followed by cultivated land.

Seventeen people attended the second open house at the Northeast Scurry County Community Center on October 15. Of those completing the questionnaire (twelve) there was a strong preference on Segment A for a "generic" route paralleling U.S. 180. There was also strong support for a route utilizing a link not shown on the alternative route boards. This route would parallel U.S. 180 west from Roby to CR 1101 in Scurry County, follow this road north (the "new" link) to Camp Springs Road, then turn west to the Plainview Substation. Also on Segment A, there was support voiced (by one

respondent each) for routes 1A, 3A, 4A, 5A, and 6A. Negative comments were voiced for links G and J. Once again, no comments were made regarding Segment B. Areas of greatest concern followed the previous night's results: residential areas/residences was the top-ranked category, followed by cultivated land.

Following these meetings, WTU decided to add the "new" link for Segment A suggested by open house attendees at the second meeting (Link G'), and adjust the other links appropriately. This created one additional route (8A) which WTU asked EH&A to include in the alternative route evaluation. Therefore EH&A's final evaluation and selection of a recommended preferred route covered eight routes (1A-8A).

In addition to the public participation in this project, WTU and MWEC representatives met with landowners, public officials, and other interested parties throughout the project. These discussions influenced both the selection of alternative routes and the evaluation of the preferred alternative.

2.2.7 Primary Alternatives

Ultimately, eight primary alternative routes for Segment A and four primary alternative routes for Segment B were selected for a thorough environmental assessment and alternatives analysis. These routes are shown on figures 2-2a and 2-2b (map pocket) and are the only alternatives addressed in detail in this report. Table 2-1 illustrates the composition of these routes by link, as well as their approximate length in miles. Each of these primary alternative routes was examined in detail in the field in August, September, and October 1996. In evaluating these routes, a variety of environmental criteria were considered. These criteria are listed in Table 2-2. The analysis of each route involved inventorying and tabulating the number or quantity of each criterion located along each route (e.g., number of creek crossings, length across cropland, etc.). The number or amount for each factor was obtained from maps and aerial photographs and verified, where possible, in the field.

2.3 PREFERRED ROUTE SELECTION

The selection of preferred routes for the Snyder to Roby Project involved both environmental and engineering evaluations of the alternative routes. A final preferred route was selected based upon a combination of these evaluations. As mentioned previously, EH&A made its recommendation based only upon environmental considerations; WTU also took into consideration cost and engineering factors in its evaluation. The results of the overall environmental evaluation of the alternative routes and selection of the preferred alternative routes are presented in Section 7.0 of this document.

TABLE 2-1

COMPOSITION AND LENGTH OF PRIMARY ALTERNATIVE ROUTES
SNYDER-ROBY 69-KV PROJECT

Route	Links	Length (miles)
	SEGMENT A	
1A	A-B-C-E-F-G-G″-M	28.07
2A	A-B-D-E-F-G-G″-M	28.34
3A	A-B-C-E-H-J-L-L′-M	27.61
4A	A-B-D-E-H-J-L-L′-M	27.89
5A	A-B-C-E-F-K-L-L′-M	27.02
6A	A-B-D-E-F-K-L-L′-M	27.29
7A	A-I-J-L-L′-M	26.72
8A	A-B-C-E-F-G-G′-L′-M	28.04
	SEGMENT B	
1B	N-Q-S	3.52
2B	O-P-Q-S	3.48
3B	O-R-S	3.20
4B	N-P-R-S	3.54

NOTE: Primary routes are shown on figures 2-2a and 2-2b (map pocket).

TABLE 2-2

ENVIRONMENTAL CRITERIA FOR
TRANSMISSION LINE EVALUATION
SNYDER-ROBY 69-KV PROJECT

LAND USE
Length of ROW parallel to existing ROW (transmission line, pipeline, roads, etc.)
Number of habitable structures[1] within 200 ft of ROW centerline
Length of alternative route
Length of ROW through recreational areas
Number of parks and/or recreational areas within 1,000 ft of ROW centerline
Length of ROW through cropland
Length of ROW through grazingland/rangeland
Length of ROW through irrigated pasture or cropland
Length of ROW across prime farmland soils
Length of ROW across gravel pits, mines, or quarries
Number of pipeline crossings
Number of transmission line crossings
Number of U.S. and State highway crossings
Number of FM and county road crossings
Number of FAA-listed airfields within 10,000 ft of ROW centerline
Number of commercial AM radio transmitters within 10,000 ft of ROW centerline
Number of FM radio transmitters, microwave towers, etc. within 2,000 ft of ROW centerline
AESTHETICS
Estimated length of ROW within foreground visual zone[2] of U.S. and State highways
Estimated length of ROW within foreground visual zone[2] of recreational or park areas
Estimated length of ROW within foreground visual zone[2] of churches, schools, hospitals, and cemeteries

TABLE 2-2 (Concluded)

ECOLOGY
Length of ROW through upland brushland/woodland
Length of ROW through bottomland/riparian woodland
Length of ROW across wetlands
Length across known habitat of endangered/threatened species
Length of ROW across open water (lakes, ponds)
Number of stream crossings
Number of river crossings
Length of ROW parallel (within 100 ft) to streams
CULTURAL RESOURCES
Number of recorded historic or prehistoric sites crossed
Number of recorded historic or prehistoric sites within 1,000 ft of ROW centerline
Number of National Register listed or determined eligible sites crossed
Number of National Register listed or determined eligible sites within 1,000 ft of ROW centerline
Length of ROW through areas of high archaeological/historic site potential

[1] Residences, businesses, schools, churches, cemeteries, hospitals, nursing homes, etc.
[2] One-half mile, unobstructed

3.0 EXISTING ENVIRONMENT

3.0 EXISTING ENVIRONMENT

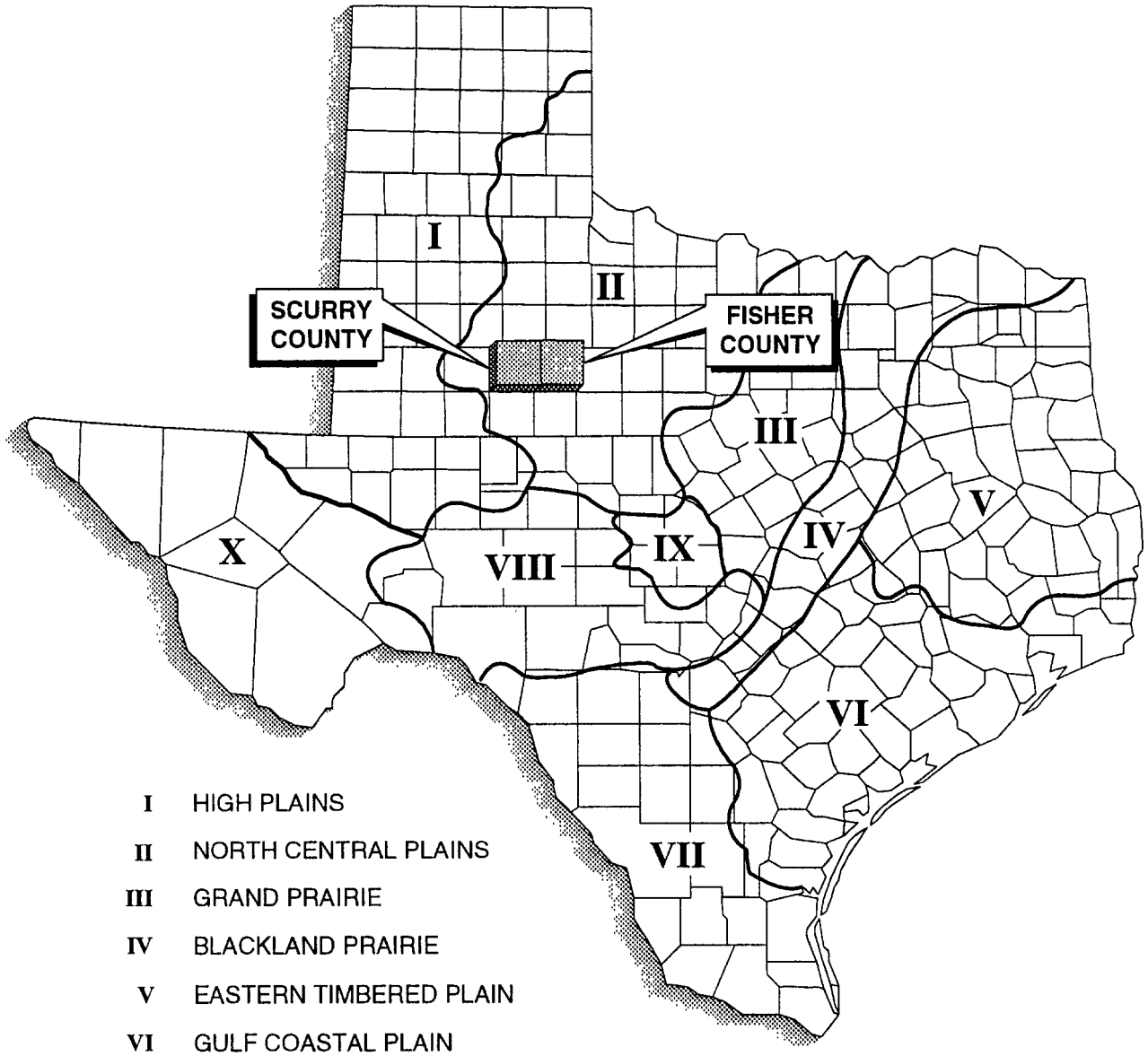
3.1 PHYSIOGRAPHY AND GEOLOGY

The study area lies within the Northwestern Texas Lowland Geographic Region of Texas (Chambers, 1948). The Northwestern Texas Lowlands are the eroded margin of the Great Plains east of the Llano Estacado district of the High Plains and are part of the larger North Central Plains Physiographic Province of Texas (Atwood, 1940; Bureau of Economic Geology (BEG), 1977; Hunt, 1967) (Figure 3-1).

The North Central Plains Physiographic Province is a southwestern extension of the North American Interior Lowlands and is characterized by low local relief and is surrounded by regions of greater altitude and by regions not affected by glaciation (Fenneman, 1917). The boundary in Texas between the Interior Lowlands and the High Plains Section of the Great Plains is generally an east-facing escarpment several hundred feet high. The eastern flowing streams of this region form wide valleys of Quaternary alluvium and fluviatile terrace deposits by deeply cutting the escarpment and exposing the underlying structural geology composed of the Triassic and Permian formations (Fenneman, 1938).

The North Central Plains Physiographic Province of Texas has had many localized physiographic designations: the Abilene-Haskell Plains, the Gypsum Plains, the Osage Plains, the Red Bed Plains, and most recently the West Texas Rolling Plains (Johnson, 1931; Swanson, 1995). Each of these designations are based on major landscape differences, and the study area lies across these differing physiographic regions. To better understand the landscape of the study area, the major physiographic differences have been grouped into the common characteristics of the Northwestern Texas Lowland Geographic Region.

The Northwestern Texas Lowland is generally characterized by an eastward-sloping plain with level to rolling land on stream divides. A few flat topped uplands (the remnants of a former high plain) are scattered throughout the region, and in some areas the severely dissected Permian Red Beds have a badlands topography. This region is bounded by the Red River on the north, the Western Cross Timbers on the east, the Edwards Plateau on the south, and the Llano Estacado on the west (BEG, 1977; Chambers, 1948). The elevation rises from an altitude of about 750 ft along the eastern edge bordering the Cross Timbers/Blackland region to about 2,000 ft along the western edge at the base of the Caprock Escarpment of the Llano Estacado. The strata underlying this region generally dip northwestward at a



I HIGH PLAINS
II NORTH CENTRAL PLAINS
III GRAND PRAIRIE
IV BLACKLAND PRAIRIE
V EASTERN TIMBERED PLAIN
VI GULF COASTAL PLAIN
VII RIO GRANDE PLAIN
VIII EDWARDS PLATEAU
IX LLANO BASIN
X TRANSPECOS BASIN & RANGE

north

0 100 200 300
scale in kilometers

100 0 100 200
scale in miles

Source: BEG, 1970/1977

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Figure 3-1
LOCATION OF
FISHER AND SCURRY COUNTIES
IN RELATION TO THE
PHYSIOGRAPHIC PROVINCES OF TEXAS
WTU/MWEC

low angle so that the out-cropping margins form east-facing escarpments along narrow belts that run north to south (BEG, 1932).

The surface geologic units within the study area include the most recent alluvium deposits, undivided surface deposits, wind blown sand, the Ogallala Formation, and the Quartermaster, Dockum and Whitehorse groups. The recent alluvium and undivided surface deposits are composed of sedimentary rocks created by the dissection of Pennsylvanian and Permian sediments and by floodplain deposition within the Quaternary period (BEG, 1986). During the late Tertiary period, the recharge sands and gravels of the Ogallala Formation were laid down. The caliche caprock of the Ogallala Formation now constitutes the uppermost strata on the caprock escarpment of the High Plains. The Callahan Divide, an uplift remnant dividing the Colorado and Brazos River basins, extends northward into the study area and is capped by the Ogallala Formation (BEG, 1964).

Within the study area, the Quartermaster, Dockum, and Whitehorse groups consist of thin outcrops of sandstone, dolomite, non-marine red shales (red beds), and gypsum. These groups represent the deep bedrock stratigraphy of the Pennsylvanian and Permian periods. The Bend Arch and the Eastern Shelf, large buried structural features of these periods, underlie an extensive and prolific oil and gas field known locally as the Canyon Reef Oil Field. A portion of this oil field is located adjacent to and northwest of the study area near the City of Snyder in Scurry County. In eastern Scurry County and in western Fisher County, there is a thin outcrop of gypsum near the deeply dissected headwaters of the Clear Fork of the Brazos River. Several companies actively mine these outcrops due to the commercial value of gypsum in the manufacture of wall board and other products (BEG, 1974; Sellards and Baker, 1934).

3.2 SOILS

The soil surveys for Scurry County (Soil Conservation Service (SCS), 1973) and Fisher County (SCS, 1966) were used to describe the soil associations found in the study area. The SCS is now known as the Natural Resources Conservation Service (NRCS).

3.2.1 Soil Associations

The study area contains eight soil associations; three in Scurry County and five in Fisher County. These associations are the Rowena-Abilene-Olton soils, Miles-Cobb soils, and Mansker-Potter

OVERSIZED MAP(S)

TO VIEW
OVERSIZED MAP(S),
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soils in Scurry County; and the Carey-Woodward, Tillman-Wichita, Miles-Wichita, Miles-Travessilla, and the Spur-Yahola associations in Fisher County.

Scurry County

The Rowena-Abilene-Olton Association occupies about 40% of the county, and consists of loamy soils that are well-drained and moderately permeable. The Rowena-Abilene soils are found on broad areas of nearly level to gently sloping topography while the Olton soils are found on side slopes along stream divides. The Rowena-Abilene soils account for approximately 51% of the association while the Olton soils make up approximately 33% of the unit. The remaining 16% of the association is composed of minor soils including Mansker, Roscoe, Lipan, and Spur series. Rowena-Abilene soils typically have brown and dark grayish-brown clay loams underlain by clays and clay loams. Olton soils have brown to reddish-brown clay loam to clay in the subsurface. About 85% of this association is cultivated while the rest is used as rangeland.

The Miles-Cobb Association consists of moderately permeable loamy soils. Occupying 26% of the county, the Miles-Cobb Association consists of broad areas of nearly level to gently sloping soils. About 70% of this association is cultivated. The rest is used as rangeland. The Miles and Cobb soils are brown to reddish-brown fine sandy loams. The Miles soils developed in old alluvium. The Cobb soils developed over red bed sandstone. About 57% of this association is Miles-Cobb soils and about 43% is Spade, Mansker, Latom, Olton, Abilene, Rowena, Veal, Brownfield, Tivoli, Colorado, and Spur soils.

The final soil association in the Scurry County portion of the study area is the Mansker-Potter Association. This association makes up about 16% of the county and consists of well-drained moderately permeable loamy soils. The association is about 49% Mansker soils that are nearly level to gently sloping, and about 34% Potter soils that are gently sloping to steep. About 17% of this association consists of minor soils. The Mansker-Potter Association makes up a large part of the rangeland of the county.

Fisher County

The Carey-Woodward Association consists of gently sloping to moderately sloping loamy soils. This association is on uplands that are cut by drainageways that are well or moderately defined. The Carey soils are on nearly level to strongly rolling uplands, have a reddish-brown loamy surface layer,

and a subsoil of reddish-brown friable sandy clay loam. The Carey soils occupy about 54% of the association, and about two-thirds of their acreage is cultivated. The surface layer of the Woodward soils is slightly more sandy and calcareous than the surface layer of the Carey soils. The subsoil is a layer of yellowish red loam. The Woodward soils developed over red bed materials. These soils make up about 25% of the association, and about one-half of their acreage is cultivated. The Carey-Woodward Association is the most extensive association in the county, and about half of this association is under cultivation for cotton and grain sorghum.

The Tillman-Wichita Association consists of gently sloping to very strongly sloping or steep clayey soils of escarpments and dissected areas. About 30% of the association is under cultivation by cotton, wheat, and grain sorghum. The rest of the association has a cover of short grasses and is used as rangeland. The Tillman soils consist of a reddish-brown non-calcareous clay loam with a subsoil of reddish-brown clay, and they make up about 31% of this association. The Wichita soils have a surface layer of reddish-brown loam or clay loam over a subsoil of reddish-brown to dark reddish-brown sandy clay. The Wichita soils occupy about 40% of the association. The rest of the association is composed of various soils that form over outcrops of the red beds and over outcrops of gypsum. These various soils have been dissected by stream channels and are rough; earning them the name of the badlands. The badlands consist of calcareous clay over unweathered clay, and in some places by caliche. The topography of the badlands include nearly vertical escarpments and very strongly sloping walls of stream channels and gullies.

The Miles-Wichita Association consists of gently sloping reddish soils occupying low ridges. The surface is a reddish sandy layer with a subsoil of sandy clay loam or sandy clay. Most of this association is cultivated for cotton and grain sorghum. The Miles soils are reddish-brown to light-brown fine sandy loam to loamy fine sand and are moderately permeable. These soils make up about 70% of the association. The Wichita soils have a surface layer similar to the Miles soils, yet it has a firm red to reddish-brown sandy clay subsoil with slow permeability. The Wichita soils occupy about 13% of the association.

The Miles-Travessilla Association consists of the shallow and rocky soils on ridges and knobs and the deeper soils that lie protected by escarpments and between the ridges and knobs. The course textured soils of this association are a reddish-brown to light-brown sandy loam to a gravelly sandy loam that overlies conglomerate rock or sandstone. These soils are highly susceptible to wind erosion with a moderate risk of water erosion. Only about 18% of this association is cultivated.

The Spur-Yahola Association consists of the nearly level to undulating soils of the bottomlands. The soils are deep, moderately fine to medium-textured, and moderately permeable. The Spur soils have a surface layer that is composed of dark-brown clay loam and silt with a dark-brown to reddish-brown friable clay loam and silty clay loam subsoil. These soils occupy about 65% of this association. The Yahola soils have a surface layer of reddish-brown calcareous very fine sandy loam and a subsoil of very fine sandy loam that is stratified with thin layers of loamy fine sand. These soils occupy about 12% of this association. Frequently flooded alluvial land on stream banks and on the low areas adjacent to areas above the channels of the larger streams make up the rest of the association. Large localized areas of this association are unsuitable for cultivation due to the danger of flooding and wind erosion, yet approximately 30% of the Spur-Yahola Association is under cultivation with moderate to high yields of cotton and grain sorghum.

3.2.2 Prime Farmland

Prime farmland is defined by the Secretary of Agriculture in 7 CFR 657 (Federal Register, Vol. 43, No. 21) as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, or oilseed and is also available for these uses (i.e., the land could be used as cropland, pastureland, rangeland, forestland, but not land that is developed or under water). It has the soil quality, growing season, and moisture supply needed to economically sustain high yields of crops when treated and managed properly. Some soils are considered prime farmland in their native state and others are considered prime farmland only if they are drained well enough to grow the main crops in the area, or irrigated. In Scurry County, prime farmlands make up 42.9% of the total county land area while potential prime farmland makes up an additional 28%. Within the study area, the Rowena-Abilene-Olton Association contains soils that are considered prime farmland while the Miles-Cobb Association contains soils that would be considered prime farmland if they were irrigated (SCS, 1973). In Fisher County, prime farmlands make up 51.2% of the total county land area while potential prime farmland makes up an additional 24.4%. Within the study area, the Carey-Woodward Association, the Tillman-Wichita Association, the Miles-Wichita Association, and the Spur-Yahola Association contain soils that are considered prime farmland soils (SCS, 1992).

3.3 WATER RESOURCES

3.3.1 Surface Water

The study area is located on an uplift remnant that divides the Colorado and Brazos River basins. Deep Creek crosses the western portion of the study area in Scurry County and flows south through Snyder and joins the Colorado River in the southwestern corner of the county. The remainder of the study area is within the Brazos River Basin. Northeast of Snyder, Rough Creek and its tributaries drain the northeastern portion of Scurry County and join the Double Fork of the Brazos River in the northwestern corner of Fisher County. The headwaters of the Clear Fork of the Brazos River are located east of Snyder. Green Springs, along with numerous other springs, rise to the surface in the eastern portion of Scurry County feeding the Clear Fork of the Brazos River which flows eastward through Fisher County. The Double Fork of the Brazos River flows through the northwestern corner of Fisher County and is joined by Red Creek which cuts through and heavily dissects an outcropping of the red bed formation. Farther east, Gyp Creek cuts through an outcropping of gypsum and joins the Double Fork of the Brazos River north of Fisher County. To the south, the Clear Fork of the Brazos River is joined by Buffalo, Alkali, Cottonwood, and Plum creeks. These creeks and their tributaries drain the southern half of Fisher County (SCS, 1992; SCS, 1973; USGS et al., 1994; Texas Water Development Board (TWDB), 1990).

During the late spring and summer months, severe thunderstorms produce very heavy rainfall in short periods of time. The western portion of the study area is relatively flat, and due to the slow movement of water across the surface, shallow sheet erosion is produced that causes local flooding. Most of this water flows into playa lakes and is lost to evaporation. The well developed surface drainages in the eastern portion of the study area channel most of the floodwater, and only minor flooding occurs. The last major flooding in this region was in 1955. Most of the smaller tributary streams do not carry water during the entire year (SCS, 1992; SCS, 1973).

The Texas Water Commission (TWC) [which has merged with the Texas Air Control Board to form the Texas Natural Resource Conservation Commission (TNRCC)], has developed water quality standards for waters in Texas from criteria developed to protect designated uses (TWC, 1992). According to the TWC, the portion of the Brazos River Basin within the study area is in a segment of the river generally considered to be unsuitable for municipal water supplies due to high levels of salinity. Large quantities of naturally occurring sodium chloride from salt springs and seeps and large quantities of calcium and sulfates from the cross cutting of gypsum formations contribute to the heavily mineralized

water (BEG, 1986). The quality of the river improves downstream due to the dilution by good quality water (TWC, 1992).

The 100-year floodplains for the portion of the study area in Scurry County are shown on Figure 2-2a (map pocket). Floodplain information for the study area in Scurry County was obtained from Department of Housing and Urban Development (HUD) flood hazard boundary maps (HUD, 1977). The most extensive floodplains delineated by this map occur along Deep Creek, Rough Creek and the Clear Fork of the Brazos River. One-hundred year flood zone boundaries for Fisher County are not available since no floodplain mapping data has been published for this county.

3.3.2 Ground Water

Ground water provides an estimated 61% of the total water used in Texas for domestic, municipal, industrial, and agricultural purposes. Major aquifers produce large quantities of water over broad geographical areas of the state while minor aquifers constitute the only significant source of water for smaller regions. The major aquifers crossed by the Brazos River Basin include: the Ogallala, the Seymour, the Trinity, the Edwards, the Carrizo-Wilcox, and the Gulf Coast aquifers. The minor aquifers crossed by the Brazos River Basin include the Dockum Aquifer and the Brazos River Alluvium Aquifer (Texas Department of Water Resources (TDWR), 1979).

Supplying water to most of the upper part of the Brazos River Basin, the Ogallala Aquifer is composed of interbedded sand, clay, silt, gravel, and caliche. Sand makes up about 70% of the total thickness. This aquifer produces large capacity wells that yield between 500 and 1,000 gallons per minute (gpm) with less than 1,000 milligrams per liter (mg/L) dissolved solids (TWDB, 1971; TWC, 1992). The Ogallala Aquifer is being severely depleted by pumping for irrigation, yet it is the main water source for the High Plains of Texas and New Mexico. It also has the potential for severe contamination from evaporating saline lakes, salt springs, agricultural fertilizers and chemicals, and oil field salt brines (BEG, 1988).

The Seymour Aquifer is an important aquifer in isolated areas within the Brazos River Basin. It consists of interbedded deposits of coarse grained quartz sand, silt, clay, and gravel. Large capacity wells yield between 300 and 1,000 gpm with the quality of the water ranging from 500 to more than 3,000 mg/L dissolved solids (TWDB, 1971; TWC, 1992). The Seymour Aquifer supplies well water for portions of Fisher County. The chemical quality of the water varies from place to place, and water from many of the wells, although unfit for household use, can be used for watering livestock.

Municipal water is brought by pipeline from the Colorado River or from manmade lakes in other counties (SCS, 1992).

Supplying water to the central part of the Brazos River Basin, the Trinity Aquifer consists of fine grained sand interbedded with shale and clay. Wells yield between 200 and 1,000 gpm of fresh water that deteriorates gradually downdip. The Edwards Aquifer also supplies water to the central part of the Brazos River Basin. It consists of hard massive limestone that has extensive solution porosity. Wells produce up to 2,000 gpm of water that is relatively hard, yet contains less than 500 mg/L dissolved solids.

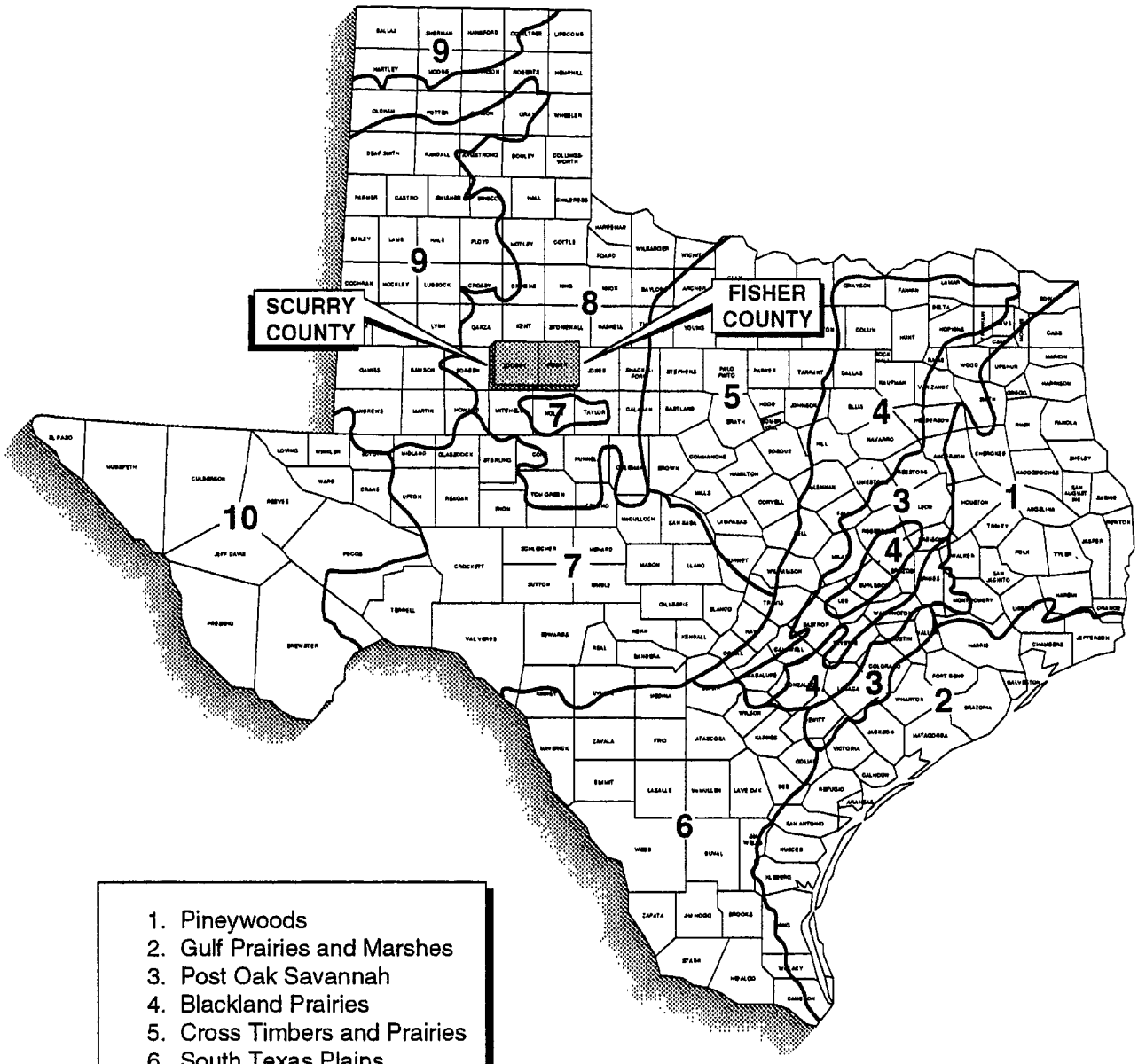
The Carrizo-Wilcox and the Gulf Coast aquifers consist of interbedded sand and clay with layers of silt. Yields of large capacity wells range from 300 to 3,400 gpm with less than 1,000 mg/L dissolved solids. The water quality deteriorates rapidly with depth near the Gulf Coast (TWDB, 1971; TWC, 1992).

Minor aquifers produce significant quantities of water within smaller geographical areas and may provide the only source of water in some regions of the state. The Dockum Aquifer constitutes one such aquifer that occurs in the western part of the Brazos River Basin, primarily in Scurry County. Although supplying eastern Scurry County with low yield and relatively shallow fresh water wells, the Dockum Aquifer does not have a significant enough yield to supply the municipal needs of the City of Snyder. The City of Snyder pumps water from the Colorado River as it crosses the southwestern corner of Scurry County (SCS, 1973; TWC, 1992). The Dockum Aquifer consists of interbedded lenses of sand, sandstone, gravel, and shale. Wells drilled into this aquifer yield from 50 to 100 gpm of fresh water with less than 500 mg/L dissolved solids. Occurring in a narrow band along the Brazos River, the Brazos River Alluvium Aquifer consists of beds of sand, gravel, silt, and clay. Wells yield between 500 and 1,400 gpm with dissolved solids ranging from 1,000 mg/L to 2,700 mg/L (TWDB, 1971; TWC, 1992, TDWR, 1984).

3.4 VEGETATION

3.4.1 Regional Vegetation

As seen in Figure 3-3, the study area lies within the Rolling Plains vegetational region of Texas (Hatch et al., 1990). It had previously been classified by Tharp (1939) as the Mesquite-Grassland region and was described at the time to be an open stand of mesquite upon a rich grassland in the gently



1. Pineywoods
2. Gulf Prairies and Marshes
3. Post Oak Savannah
4. Blackland Prairies
5. Cross Timbers and Prairies
6. South Texas Plains
7. Edwards Plateau
8. Rolling Plains
9. High Plains
10. Trans-Pecos

north

100 0 100 200

scale in miles

Source: Hatch et al., 1990

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants

Figure 3-3

LOCATION OF
FISHER AND SCURRY COUNTIES
IN RELATION TO THE
VEGETATIONAL REGIONS OF TEXAS

rolling areas. The rough, dissected portions contain shrub communities consisting of scrub-oaks, cedars, mimosas, acacias, and other woody brush. The vegetation of this region has changed from a tall- and mid-grass dominated community, to a community of shortgrasses, shrubs and annuals. Overgrazing and suppression fires have been the primary causes of this historical vegetation change (Hatch et al., 1990).

Generally, the topography within this region is nearly level to gently rolling with a range of elevation between 1,000 and 3,000 ft above mean sea level (msl). Upland soils are typically pale to reddish or dark-grayish brown sandy or clay loams and clays. They are neutral to calcarious and commonly saline, shallow and stony with pockets of deep sand. Loamy to clayey, reddish-brown, calcareous alluvial soils are found in small bottomland areas (Hatch et al., 1990).

The rainfall in this region is sporadic, mostly occurring between April and September (SCS, 1973). The summer months are very dry, often resulting in droughts. Typically, rainfall is of high intensity and short duration, causing a problem with erosion in areas with little or no vegetative cover. Most soils, however, are generally porous and well drained.

3.4.2 Vegetation Community Types in the Study Area

Vegetation community types occurring in the study area include mesquite woodland/brushland, riparian woodland, grassland (including pasture and cropland), and hydric and aquatic habitats. The eastern third of the study area is largely cropland, most of which has cotton on it. The middle third of the study area is pastureland (both improved and unimproved), mesquite woodland/brushland, and oldfield/shrub rangeland. The western third is also largely cropland. A brief description of the vegetation communities found within the study area, based largely upon the results of a field trip on 19-21 August 1996, is presented below. The dominant vegetation types are the mesquite woodland/brushland and grassland (particularly cropland). These two community types in the study area show a lot of overlap and gradation from one type to the other. Usually the same species occur, but differ in their relative abundance.

The mesquite woodland/brushland community type varies in age and density in the study area. In many places the mesquite is more shrublike and the herbaceous layer more dense. Because there is a gradation from woodland through brush and shrub, all mesquite communities are referred to as mesquite woodland/brushland. This community consists of honey mesquite (*Prosopis glandulosa*), lotebush (*Zizyphus obtusifolia*), catclaw acacia (*Acacia greggii*), elbowbush (*Forestiera pubescens*), javelina bush (*Condalia ericoides*), mimosas (*Mimosa* spp.), fragrant sumac (*Rhus aromatica*), junipers

(*Juniperus* spp.), mormon tea (*Ephedra* sp.), agarito (*Mahonia trifoliata*), baccharis (*Baccharis* sp.), narrow-leaf yucca (*Yucca glauca*), and pricklypears (*Opuntia* spp.). The herbaceous layer within this community type varies from sparse to well-developed throughout the study area. Typical species include little bluestem (*Schizachyrium scoparium*), silver bluestem (*Bothriochloa saccharoides*), King Ranch bluestem (*Bothriochloa ischaemum*), buffalograss (*Buchloe dactyloides*), switchgrass (*Panicum virgatum*), Texas wintergrass (*Stipa leuchotricha*), Texas grama (*Bouteloua rigidiseta*), sideoats grama (*Bouteloua curtipendula*), red grama (*Bouteloua trifida*), threeawns (*Aristida* spp.), lovegrasses (*Eragrostis* spp.), windmillgrass (*Chloris virgata*), green bristlegrass (*Setaria viridis*), sand dropseed (*Sporobolus cryptandrus*), johsongrass (*Sorghum halepense*), puncture vine (*Tribulus terrestris*), snakeweed (*Gutierrezia sarothrae*), sunflowers (*Helianthus* spp.), late eupatorium (*Eupatorium serotinum*), plantains (*Plantago* spp.), and crotons (*Croton* spp.).

The grassland community type consists of pastureland (improved and unimproved), oldfields, cleared ROWs, and cropland. The most common grassland type in the study area is cropland pastureland (both improved and unimproved). Grassland in the study area consists of a variety of grasses, forbs and woody species. Common grasses found in this habitat throughout the study area include little bluestem, silver bluestem, King Ranch bluestem, gramas, switchgrass, johnsongrass, windmill grass, threeawns, sand dropseed, and Texas wintergrass, among others. Brush species such as honey mesquite, agarito, and pricklypears also occur in these unimproved grasslands (see above). Improved or managed pastureland, which also occurs in the study area, is typically dominated by improved varieties of bermudagrass (*Cynodon dactylon*) and bahiagrass (*Paspalum notatum*). Crops encountered include cotton, sorghum, and orchards of peaches, apples, and pecans.

The riparian and hydric habitats within the study area occur primarily along the banks and edges of streams, stock ponds, playa lakes, and springs. Riparian habitat (narrow bands of woody vegetation occurring immediately adjacent to streams or within the channel of a relatively narrow floodplain), is of minor extent within the study area. Black willow (*Salix nigra*), hackberries (*Celtis* spp.), cottonwood (*Populus deltoides*), French tamarisk (*Tamarix gallica*), soapberry (*Sapindus saponaria*), and creek plum (*Prunus rivularis*) were encountered along some of the creeks.

Hydric habitat typically includes herbaceous wetland plant species associated with streams, impoundments, and areas of low topography. Hydric habitats in the region of interest may be defined as jurisdictional wetlands by the U.S. Army Corps of Engineers (USCE). If these areas meet the criteria necessary to define them as jurisdictional wetlands pursuant to Section 404 of the Clean Water Act, certain activities (e.g., placement of fill) within these habitats are subject to regulation. Spikerushes

(*Eleocharis* spp.), sedges (*Carex* spp.), bushy bluestem (*Andropogon glomeratus*), and cocklebur (*Xanthium* sp.) are typical species occurring within the floodplains of the creeks and along the edges of the ponds, springs, and playa lakes.

Aquatic habitat includes those areas that are predominantly water-covered (e.g., lakes, rivers, ponds, and major streams). The vegetation associated with these water bodies is minor within the study area. Species found occasionally within this habitat include pondweeds (*Potamogeton* spp.) and cattail (*Typha* sp.), along with black willow, spikerushes, and sedges. A playa lake's vegetational community varies with land use practices (livestock grazing and cultivation) and natural factors. Common vegetation species found in and around playas include dock (*Rumex* sp.), curltop smartweed (*Polygonum bicorne*), Johnsongrass, barnyardgrass (*Echinochloa crusgalli*), bulrushes (*Scirpus* spp.), devilweed (*Aster spinosus*), camphorweeds (*Heterotheca* spp.), cattail, Chinese elm (*Ulmus punila*), and black willow.

3.4.3 Commercially Important Plant Species

Important species are those which (a) are commercially or recreational valuable; (b) are endangered or threatened; (c) affect the well-being of some important species within criterion (a) or criterion (b); or (d) are critical to the structure and function of the ecological system or are biological indicators. Forage crops are commercially important plant species within the study area due to the large extent of grazing land. Dryland and irrigated sorghum, small grains, and cotton are also readily grown in the area. These croplands, because they are intermingled with rangeland, may supplement native wildlife habitat and increase recreational hunting opportunities (Hatch et al., 1990). Other crops known to occur in the study area include peaches, pecans, and apples.

3.4.4 Endangered and Threatened Plant Species

The U.S. Fish and Wildlife Service (FWS), the Texas Parks and Wildlife Department (TPWD) and the Texas Biological and Conservation Data System (BCD), formerly known as the Texas Natural Heritage Program (TXNHP), were contacted for information concerning the location of state- and federally listed plant species within the study area and vicinity. According to these resources (see letters in Appendix A), no endangered, threatened or plant species of concern (SOC) occur within the study area or within Scurry and Fisher counties.

The TPWD mentioned that the Texas poppy-mallow (*Callirhoe scabriuscula*), listed by the FWS and TPWD as endangered, is of potential occurrence in the study area. It has been recorded within

the Rolling Plains region of Texas from nearby Coke, Mitchell, and Runnels counties (Poole and Riskind, 1987; BCD, 1995). This erect, perennial plant with red to purple flowers blooms from late April to June and may grow to a height of 4 ft. Preferred habitat for this species includes deep alluvial sands found near the Colorado River. The mapping unit designation used by the SCS which identifies the preferred soil type is the hummocky Tivoli fine sand. Plant species typically associated with Texas poppy-mallow include shinnery oak (*Quercus havardii*), bullnettle (*Cnidoscolus* sp.), spiderwort (*Tradescantia* sp.), Indian blanket (*Gaillardia* sp.) and grasses such as threeawn and dropseed (Poole and Riskind, 1987). This endangered plant could potentially occur within the study area where Tivoli fine sands are found.

3.4.5 Ecologically Sensitive Areas

In general, any area may be considered ecologically sensitive if: 1) it supports a rare plant or animal community; 2) it is valuable due to its maturity and the density and diversity of plants and animals it contains; or 3) it supports a community of plants adapted to flooding and/or saturated soil conditions and dominated by species considered to be wetland indicators by a regulatory agency (e.g., the USCE).

According to BCD data files (see letter, Appendix A), no potentially sensitive plant communities have been identified within or near the study area. Within the study area, ecologically sensitive areas are most likely limited to stands of native vegetation, wooded riparian areas, upland woods or brush and potential jurisdictional wetlands as defined by the USCE (1987).

3.4.5.1 Regulatory Wetlands

Plant communities adapted to flooding and saturated soil conditions and dominated by species considered to be wetland indicators by a regulatory agency (i.e. the USCE) may be considered ecologically sensitive. Characteristics of these hydric habitats that contribute to their ecological value include high levels of productivity and species diversity, utilization by numerous wildlife species, dependence upon and functional values of particular hydrologic factors, and high or predominant occurrence of species considered to be wetland indicators.

The NWI mapping on 1:24,000 topographic quadrangle maps prepared by the FWS indicates potential wetlands throughout the study area, including numerous hydric categories such as open water, emergent wetlands (both farmed and non-farmed), scrub-shrub wetlands, and riverine areas, as described by Cowardin et al. (1979).

Certain construction activities involving the placement of fill material within waterways, impoundments, or wetlands are authorized under Nationwide Permit No. 26. This permit allows for the discharge of fill material into headwaters and isolated waters of the U.S. If the loss of waters of the U.S. is less than 1 ac, notification of the USCE is not required. This permit does not authorize the construction of permanent elevated access and maintenance roads beyond the nationwide permit for minor road crossings (33 CFR Part 330.5(a)(14)). Construction of the project may commence without notification to the district engineer as long as the project meets the conditions and provisions of the nationwide permit (see copy in Appendix A).

3.5 WILDLIFE

3.5.1 Wildlife Habitats and Species

The study area lies within the Kansan Biotic Province (Blair, 1950) (Figure 3-4), and faunal communities of this province are a mix of eastern forest species and western grassland species. The Kansan Biotic Province closely coincides with the Rolling Plains and High Plains as described by Hatch et al. (1990). The Kansan Biotic Province contains over 59 species of mammals, 5 of which are restricted to this province in Texas. Other vertebrate fauna found within this province include 31 species of snakes (including 2 endemics), 14 anurans (frogs and toads) and 1 urodele (salamanders and newts) (Blair, 1950).

Wildlife habitats in the study area correspond to the vegetation types described in Section 3.4.2, which are representative of the ecological zones mentioned. These habitats include mesquite woodland/brushland, grassland (including pastureland and cropland), and hydric and aquatic habitats.

Aquatic habitats in the study area are dominated by small perennial streams, intermittent streams, diked impoundments (stock ponds), and playa lakes. Stream habitats include Buffalo Creek, Alkali Creek, and the Clear Fork of the Brazos River. The ephemeral aquatic habitats in the study area are dry much of the year and do not support a significant fish fauna. While spring-fed creeks or portions of spring-fed creeks contained water, many of the creeks were dry during EH&A's August field visit.

The streams of the study area support aquatic species primarily adapted to ephemeral pool habitats. Because they consist of small headwater drainages in a predominantly rocky to sandy clay substrate, flow is unlikely to be sufficiently persistent to support any substantial lotic assemblage. Stream